

CLAIMS

What is claimed is:

1. An apparatus for inspecting a disc-like substrate comprising a holding
5 structure having members arranged to hold and rotate the substrate about a first axis, the
holding structure being coupled to a rotatable member, the rotatable member configured to
rotate the holding structure about a second axis different from the first axis.
- 10 2. The apparatus, as set forth in claim 1, wherein the members comprise a
plurality of wedge assemblies configured to rotate the substrate about the first axis.
- 15 3. The apparatus, as set forth in claim 1, wherein the first axis is disposed
generally perpendicular to a flat surface of the substrate and extends generally through an
axial center of the substrate.
- 20 4. The apparatus, as set forth in claim 1, wherein the holding structure comprises
two L-shaped gripping arms arranged to form a single U-shaped structure and configured to
hold the substrate substantially parallel to the gripping arms.

5. The apparatus, as set forth in claim 4, wherein the U-shaped structure is configured to open and close about the perimeter of the substrate.

6. The apparatus, as set forth in claim 5, further comprising tensioning springs configured to permit the U-shaped structure to open and close about the perimeter of the substrate.

7. The apparatus, as set forth in claim 2, wherein the holding structure comprises three wedge assemblies, at least one wedge assembly coupled to a motor and configured to rotate the substrate about the first axis disposed generally perpendicular to a flat surface of the substrate and extending generally through an axial center of the substrate.

8. A method of inspecting a semiconductor wafer comprising the acts of:

- (a) loading the substrate into a holding structure, the substrate having a first surface and a second surface;
- (b) inspecting the first surface of the substrate by rotating the substrate within the holding structure about a first axis, the first axis disposed

generally perpendicular to the surface of the substrate and extending
generally through the axial center of the substrate;

(c) rotating the holding structure about a rotatable member to rotate the
substrate approximately 180° about a second axis, the rotatable
member being mechanically coupled to the holding structure;

(d) inspecting the second surface of the substrate; and

(e) removing the substrate from the holding structure.

9. The method as set forth in claim 8, wherein act (a) further comprises the acts

of:

(a) opening gripper arms of the holding structure;

(b) inserting the substrate into a wedge assembly on the gripper arms;

(c) retracting the wedge assembly; and

(d) closing the gripper arms.

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- (a) disposing a plurality of integrated circuit devices onto a silicon wafer;

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- (1) loading the wafer into a wafer holding structure, the wafer having a first surface and a second surface;

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- (2) inspecting the first surface of the wafer by rotating the wafer within the wafer holding structure about a first axis, the first axis disposed generally perpendicular to the surface of the wafer and extending generally through the axial center of the wafer;

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- (3) rotating the wafer holding structure about a rotatable member to rotate the wafer approximately 180° about a second axis, the rotatable member being mechanically coupled to the wafer holding structure;

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- (4) inspecting the second surface of the wafer; and

- (5) removing the wafer from the wafer holding structure.

(c) electrically testing the integrated circuit devices;

(d) singulating the integrated circuit devices; and

(e) packaging selected singulated integrated circuit devices to form
respective integrated circuit packages.

16. The method as set forth in claim 15, wherein act (b)(1) comprises the acts of:

(a) opening gripper arms of the wafer holding structure;

(b) inserting the wafer into a wedge assembly on the gripper arms;

(c) retracting the wedge assembly; and

(d) closing the gripper arms.

17. The method, as set forth in claim 15, wherein act (b)(2) comprises the act of
rotating the wafer within the wafer holding structure until a notch on the first surface of the
wafer is optically sensed.

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18. The method, as set forth in claim 15, wherein act (b)(2) comprises the act of rotating the wafer within the wafer holding structure by using a wedge assembly mechanically coupled to a drive motor, the wedge assembly being coupled to the wafer.

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19. The method, as set forth in claim 18, comprising controlling the rotation of the wafer by using an operator driven joystick coupled to control the drive motor.

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20. The method, as set forth in claim 15, wherein act (b)(3) comprises the act of rotating the wafer holding structure about a rotatable member by using a pitch motor, the pitch motor being operably coupled to the rotatable member.

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21. The method, as set forth in claim 20, comprising controlling the rotation of the wafer by using an operator driven joystick coupled to control the pitch motor.

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